

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A hologram retrieval method comprising the steps of:
~~irradiating emitting~~ a signal beam beam;
~~modulating the signal beam, that has been modulated by a spatial light modulator~~
~~modulator, using a retrieval data page containing a data image to be retrieved-retrieved;~~
~~irradiating the modulated signal beam onto a holographic recording medium having~~
~~digital information recorded thereon as in the form of data pages each formed of a two-~~
~~dimensional bit map image with image, each data page being multiplexed to transmit a~~
~~diffracted beam; and~~
~~receiving one or more diffracted beams emitted from the holographic recording~~
~~medium;~~
~~detecting a target diffracted beam having a maximum intensity of the one or more~~
~~diffracted beams; and~~
~~determining a data image address provided to the signal beam using a resulting~~
~~diffracted beam, wherein: of the target diffracted beam as the data image address of a target~~
~~data page,~~
~~wherein the data page-pages is formed of each include a plurality of equally divided~~
~~data blocks and blocks, a data image is formed within each data block by an encoding method~~
~~for providing that provides a certain number of ON pixels; pixels, and~~
~~the spatial light modulator encodes the data image to be retrieved by the encoding~~
~~method to display it as block information on in at least one retrieval data block of the retrieval~~
~~data page used to modulate the signal beam in the step of modulating the signal~~
~~beam, associated with the data block and modulates a signal beam using the block~~

~~information, and of resulting diffracted beams, a diffracted beam of the maximum intensity is used to identify an address of a data block and a data page containing a target data image.~~

2. (Currently Amended) The hologram retrieval method according to claim 1, wherein

~~all pixels in a retrieval the data block blocks of the retrieval data page other than a the at least one retrieval data block on which the block information is displayed are OFF pixels.~~

3. (Currently Amended) The hologram retrieval method according to claim 1, wherein

~~part of one data blocks block in the each data page of the holographic recording medium is employed as a dedicated retrieved retrieval data block, and an encoding method is used to provide a larger number of ON pixels for in a data image formed in the dedicated retrieved retrieval data block than for a data image images of another the other data block blocks of the data page.~~

4. (Currently Amended) The hologram retrieval method according to claim 2, wherein

~~part of one data blocks block in the each data page of the holographic recording medium is employed as a dedicated retrieved retrieval data block, and an encoding method is used to provide a larger number of ON pixels for in a data image formed in the dedicated retrieved retrieval data block than for a data image images of another the other data block blocks of the data page.~~

5. (Currently Amended) The hologram retrieval method according to claim 1, ~~wherein~~ further comprising:

adjusting a beam diameter and an optical path of the signal beam ~~are adjusted~~ such that the signal beam passes substantially only through ~~a the~~ at least one retrieval data block displayed on the spatial modulator.

6. (Currently Amended) The hologram retrieval method according claim 1,
wherein

the ~~block information encoded data image to be retrieved~~ is sequentially displayed on
the ~~plurality of at least one~~ retrieval data ~~blocks~~ block in the spatial light modulator.

7. (Currently Amended) The hologram retrieval method according to claim 2,
wherein

the ~~block information encoded data image to be retrieved~~ is sequentially displayed on
the ~~plurality of at least one~~ retrieval data ~~blocks~~ block in the spatial light modulator.

8. (Currently Amended) The hologram retrieval method according to claim 1,
wherein

the ~~block information encoded data image to be retrieved~~ is displayed at the same time
~~on in all retrieval of the data blocks in the retrieval data page used by the spatial light~~
~~modulator, and of a plurality of resulting diffracted beams, a diffracted beam of the maximum~~
~~intensity is used to identify a data page containing the block information.~~ modulator.

9. (Currently Amended) A hologram retrieval method comprising the steps of:
generating a signal beam;
modulating the signal beam by a spatial light modulator using a retrieval data page
including a data image to be retrieved;

irradiating a the modulated signal beam that has been modulated by a spatial light
modulator using a data image to be retrieved onto a holographic recording medium having
digital information recorded thereon as in the form of data pages ~~pages~~, each data page
formed of a two-dimensional bit map ~~image with image~~, each data page being multiplexed to
transmit a diffracted beam; and

receiving one or more diffracted beams emitted from the holographic recording
medium;

detecting a target diffracted beam having a maximum intensity of the one or more diffracted beams; and

determining a data image address of the target diffracted beam as the data image address of a target data image,~~detecting a data image address provided to the signal beam using a resulting diffracted beam, wherein:~~

wherein the data page is pages are formed of a plurality of equally divided equally-sized data blocks~~blocks, each data block containing and a data image is formed in each data block~~by an encoding method for providing that provides a different number of ON pixels for each data block;~~block, and~~

the spatial light modulator encodes the same data image to be retrieved by the encoding method to display it as block information on in all of the retrieval data blocks of the retrieval data page associated with the data block and modulates a signal beam using the block information, and an amount of light of a resulting diffracted beam is used to identify an address of a data block and a data page containing a data image to be retrieved.~~used to modulate the signal beam in the step of modulating the signal beam.~~

10. (Currently Amended) The hologram retrieval method according claim 1, wherein further comprising:

generating a reproduction reference beam associated with to retrieve the identified target data page~~page; and~~

irradiating the holographic recording medium by the reproduction reference beam is~~used for irradiation to reproduce retrieval information.~~

11-12. (Canceled)

13. (Currently Amended) The hologram retrieval method according to claim 8, wherein further comprising:

generating a reproduction reference beam associated with to retrieve the identified target data page-page; and

irradiating the holographic recording medium by the reproduction reference beam is used for irradiation to reproduce retrieval information.

14. (Currently Amended) The hologram retrieval method according to claim 9, wherein further comprising:

generating a reproduction reference beam associated with to retrieve the identified target data page-page; and

irradiating the holographic recording medium by the reproduction reference beam is used for irradiation to reproduce retrieval information.

15. (Currently Amended) A holographic recording and reproducing apparatus comprising:

an object optical system that directs an object beam to a holographic recording medium having a hologram recorded thereon; and

a reference optical system that directs for directing an object beam and a reference beam to a the holographic recording medium;

a spatial light modulator provided in the object optical system to allow that displays to be recorded to be retrieved digital information to be displayed as a in at least one retrieval data block of a retrieval data page-page, the retrieval data page formed of a two-dimensional bit map image, including a plurality of data blocks, including the at least one retrieval data block, the data blocks being equally sized with each other, thereby being capable of modulating an object beam; wherein the object optical system modulates the object beam by the to-be-retrieved data page;

a retrieval imaging device for receiving a plurality of diffracted beams produced when by the holographic recording medium having a when the hologram-holographic recording

~~medium recorded thereon~~ is irradiated with a the modulated object signal beam output from the object optical system;

a signal processing circuit for processing an output signal from the retrieval imaging device, and that identifies an address of a target data page containing the to-be-retrieved digital information as an address corresponding to a diffracted beam having a maximum intensity of the plurality of diffracted beams

a reproduction imaging device for receiving a diffracted beam produced ~~at the time of~~ by the holographic recording medium in response to irradiation with a reproduction reference beam from the reference optical system, wherein:

the spatial light modulator ~~is capable of displaying the digital information as an encoded~~ encodes the to-be-retrieved digital information data image on in the at least one each of retrieval data blocks block obtained by dividing of the retrieval the data page into a plurality of equal parts, and is capable of allowing a to-be-retrieved data image to be encoded by the same encoding method as for the data image and displayed as block information; and
—— ~~the signal processing circuit identifies an address of a data page containing the data image based on a diffracted beam of the maximum intensity of the plurality of diffracted beams page.~~

16. (Currently Amended) The holographic recording and reproducing apparatus according to claim 15, wherein

the spatial light modulator is configured such that all pixels in ~~a retrieval data block blocks of the retrieval data page other than a retrieval the at least one retrieval data block on in which the block information to-be-retrieved digital information is displayed~~ are OFF pixels.

17. (Currently Amended) The holographic recording and reproducing apparatus according to claim 15, wherein

the spatial light modulator is designed such that ~~part one of the~~ data blocks in ~~the each~~ data page is employed as a dedicated ~~retrieved~~ retrieval data block, and an encoding method is used to provide a larger number of ON pixels for a data image formed in the dedicated ~~retrieved~~ retrieval data block than for ~~a data image of another images in the other data~~ block blocks of the data page.

18. (Currently Amended) The holographic recording and reproducing apparatus according to claim 16, wherein

the spatial light modulator is designed such that ~~part one of the~~ data blocks in ~~the each~~ data page is employed as a dedicated ~~retrieved~~ retrieval data block, and an encoding method is used to provide a larger number of ON pixels for a data image formed in the dedicated ~~retrieved~~ retrieval data block than for ~~a data image of another images in the other data~~ block blocks of the data page.

19. (Currently Amended) The holographic recording and reproducing apparatus according to claim 15, wherein

the object optical system is configured such that a beam diameter and an optical path of the signal beam can be adjusted so that the signal beam passes substantially only through a the at least one retrieval data block displayed on the spatial modulator.

20. (Currently Amended) The holographic recording and reproducing apparatus according to claim 15, wherein

the spatial light modulator is configured such that the ~~block information to be~~ retrieved digital information can be sequentially displayed on the plurality of retrieval data blocks.

21. (Canceled)

22. (Currently Amended) The holographic recording and reproducing apparatus according to claim 15, wherein:

the spatial light modulator is configured such that the ~~block information to be-~~
~~retrieved digital information~~ can be displayed at the same time ~~on in~~ all ~~retrieval of the~~ data
 blocks in ~~the retrieval data page of the spatial light modulator;~~ and
~~the signal processing circuit is configured such that of a plurality of diffracted beams~~
~~obtained from the retrieval imaging device, a diffracted beam of the maximum intensity is~~
~~used to identify a data page containing the block information.~~ modulator.

23. (Currently Amended) A holographic recording and reproducing apparatus comprising:

an object optical system that directs an object beam to a holographic recording
medium having a hologram recorded thereon; and

a reference optical system ~~for directing that directs~~ an object beam and a reference
 beam to ~~a~~ the holographic recording medium;

a spatial light modulator provided in the object optical system ~~to allow that displays~~
~~to-be-recorded digital information to be displayed as a to-be-recorded data image in at least~~
~~one of a plurality of data blocks of as a retrieval data page page, the retrieval data page being~~
~~formed of a two-dimensional bit map image, the retrieval data page including the plurality of~~
~~data blocks, the data blocks being equally sized with each other, thereby being capable of~~
~~modulating an wherein the object beam;~~ optical system modulates the object beam by the to-
be-recorded digital information;

a retrieval imaging device for receiving a plurality of diffracted beams produced ~~when~~
~~by the holographic recording medium having a hologram recorded thereon when the~~
holographic recording medium is irradiated with ~~a the modulated object signal beam output~~
 from the object optical system;

a signal processing circuit for processing an output signal from the retrieval imaging
~~device; and device, and for identifying an address of a target data block and a target data page~~

corresponding to the diffracted beam having a maximum intensity of the plurality of diffracted beams; and

a reproduction imaging device for receiving a diffracted beam produced at the time of irradiation with a reproduction reference beam from the reference optical system, wherein

~~the spatial light modulator is capable of displaying the digital information as a data image, encodes the to-be-recorded data image being encoded by an encoding method to generate the to-be-recorded digital information, the encoding method for providing provides a~~
different number of ON pixels for each data ~~block, block of a data~~ on each of data blocks obtained by dividing the data page into a plurality of equal parts, and is capable of allowing the to-be-retrieved data image to be encoded by the same encoding method as for the data image and displayed as block information, and page.

~~the signal processing circuit identifies an address of a data block and a data page containing a data image being retrieved based on an amount of diffracted light obtained from the retrieval imaging device.~~